

# OPERATOR'S MANUAL

# 650311-X & 650312-X

INCLUDING: SPECIFICATIONS, SERVICE KITS, GENERAL INFORMATION, TROUBLESHOOTING.

RELEASED: 10-10-12

INCLUDE MANUALS: 65106-X Lower Pump End (pn 97999-578), 67316 Air Motor (pn 97999-1045) & S-632 General Information Manual (pn 97999-624)

(REV. B)

**2" AIR MOTOR**  
**2:1 RATIO**  
**3" STROKE**

## 650311-X & 650312-X TWO BALL PUMP SERIES with Cycle Sensor Stainless Steel



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

### SPECIFICATIONS

**Model Series** (refer to option chart) ..... 650311-X & 650312-X  
**Pump Type** ..... Air Operated, Two Ball, Stainless Steel Pump  
**Ratio** ..... 2:1  
**Air Motor** ..... 67400  
**Motor Repair Kit** ..... 637377  
**Motor Diameter** ..... 2" (5.08 cm)  
**Stroke** ..... 3" (7.62 cm)  
**Air Inlet** (female) ..... 1/4 - 18 N.P.T.F. - 1

#### Lower Pump End Series

**650311** ..... 65108  
**650311-4** ..... 65108-4  
**650311-5** ..... 65108-5  
**650311-6** ..... 65108-6  
**650311-7** ..... 65108-7  
**650311-8** ..... 65108-8  
**650311-9** ..... 65108-9  
**650312** ..... 65106  
**650312-4** ..... 65106-4

#### Lower End repair kit

**650311-4/-6, 650312-4** ..... 637010-4  
**650311/650311-5, 650312** ..... 637010  
**650311-8** ..... 637010-6  
**650311-7/-9** ..... 637010-5  
**Material Inlet** (female) ..... 1-1/4 - 11-1/2 N.P.S.M  
**Material Outlet** (female) ..... 3/4 - 14 N.P.T.F. - 1  
**Weight** ..... see chart

### PUMP PERFORMANCE

**Air Inlet Pressure Range** ..... 0 - 150 p.s.i. (0 - 10.3 bar)  
**Fluid Pressure Range** ..... 0 - 343 p.s.i. (0 - 23.6 bar)  
**Maximum Rec'd Cycles / Minute** ..... 120  
**Maximum Working Flow Rate** ..... 4.26 g.p.m. (16.121 p.m)  
**Displacement / Cycle @ 100 p.s.i** ..... 8.2 in.<sup>3</sup> (134.3 ml)  
**Volume / Cycle** ..... 4.5 oz. (134.3 ml)  
**Cycles Per Gallon** ..... 28  
**Noise Level** ..... 80 db(A)①

#### Accessories Available

61113 Wall Mount Bracket  
66073-1 AirLine Connection Kit

① The pump sound pressure level has been updated to an Equivalent Continuous Sound Level (LAeq) to meet the intent of ANSI S1.13-1971, CAGI-PNEUROP S5.1 using four microphone locations.

### PUMP DATA

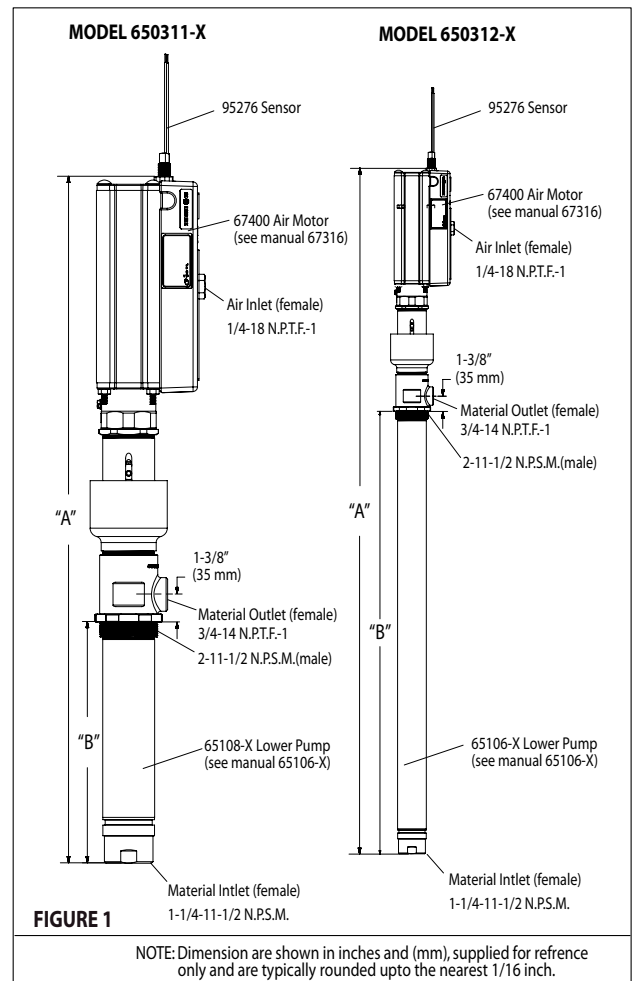


FIGURE 1

NOTE: Dimension are shown in inches and (mm), supplied for reference only and are typically rounded upto the nearest 1/16 inch.

MODEL	"A" (mm)	"B" (mm)	WEIGHT (kg)
650311-X	28.093" (714)	9.875" (251)	23 (10.4)
650312-X	51.437" (1306)	33.219" (846)	41 (18.6)

### IMPORTANT

This is one of four documents which support the pump. Replacement copies of these forms are available upon request.

- 650311-X & 650312-X** Model Operator's Manual (pn 97999-1588)
- S-632** General Information - Industrial Piston Pumps (pn 97999-624)
- 65106-X** Lower Pump End Operator's Manual (pn 97999-578)
- 67316** Air Motor Operator's Manual (pn 97999-1045)

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# ARO

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# PUMP OPTION DESCRIPTION CHART

65031-X-X

Container Suitability  
Description

## CONTAINER SUITABILITY

- 1 - Universal (stub)
- 2 - 55 Gallon

## DESCRIPTION

- PTFE packing (upper and lower)/ Plain Rod & Tube
- 4 - UHMW-PE packing(upper and lower) / Plain Rod & Tube
- 5 - PTFE packing (upper and lower) / Ceramic Coated Rod & Tube
- 6 - UHMW-PE packing(upper and lower) / Ceramic Coated Rod & Tube
- 7 - Viton packing(upper)/UHMW-PE packing (lower)/ Ceramic Coated Rod & Tube
- 8 - Viton packing(upper)/PTFE packing (lower)/ Plain Rod & Tube
- 9 - Viton packing(upper)/UHMW-PE packing (lower)/ Plain Rod & Tube

## GENERAL DESCRIPTION

Model 65031X-X Series two-ball, double acting pumps are intended to be used primarily for oil transfer and delivery systems. It is best to use this pump with low -- medium viscosity fluids. It uses Stainless steel and other materials which make it compatible with most petroleum based lubrication products. The two-ball design provides better priming of the lower foot valve. Double acting pumps will deliver material on both the up and down stroke.

NOTE: If this pump was purchased separately (not part of a system), consult your sales representative for compatible dispensing accessories which will best match the application. All accessories must be able to withstand the maximum pressure developed by the pump.

**⚠️ WARNING HAZARDOUS PRESSURE. Do not exceed maximum operating pressure of 343 p.s.i. (23.6 bar) at 150 p.s.i. (10.3 bar) inlet hydraulic pressure.**

**Pump Ratio X = Maximum Pump Inlet Pressure to Pump Motor Fluid Pressure**

Pump ratio is an expression of the relationship between the pump motor area and the lower pump end area. EXAMPLE: When 150 p.s.i. (10.3 bar) inlet pressure is supplied to the motor of a 4:1 ratio pump, it will develop a maximum of 600 p.s.i. (41.4 bar) fluid pressure (at no flow) - as the fluid control is opened, the flow rate will increase as the motor cycle rate increases to keep up with the demand.

**⚠️ WARNING Refer to general information sheet for additional safety precautions and important information.**

NOTICE: Thermal expansion can occur when the fluid in the material lines is exposed to elevated temperatures. Example: Material lines located in a non-insulated roof area can warm due to sunlight. Install a pressure relief valve in the pumping system.

Replacement warning label (pn 94520) is available upon request.

## TROUBLE SHOOTING

Pump problems can occur in either the Air Motor Section or the Lower Pump End Section. Use these basic guidelines to help determine which section is affected. Be sure to eliminate any possible non-pump problems before suspecting pump malfunction.

### Pump will not cycle.

- No pressure to the motor. See motor manual.
- Damaged motor. Service motor.

### No material at the outlet (pump continually cycles).

- Check the material supply, disconnect or shut off the air supply and replenish the material, reconnect.

### Material on one stroke only (fast downstroke).

- The lower check may not be seating in the foot valve (see lower pump disassembly). Remove the check from the foot valve, clean and inspect the valve seat area. If check or foot valve are damaged, replace.

### Material on one stroke only (fast upstroke).

- The middle packings may be worn (see lower pump disassembly). Replace the seals as necessary.

## PUMP CONNECTION - UPPER / LOWER

NOTE: All threads are right hand.

1. Loosen (90606) lock nut and unscrew the entire pump from the air motor. This will expose (94445) adapter (see figure 2).
2. Unscrew (94445) adapter to remove pump assembly from the air motor.

3. Remove the (Y15-21) cotter pin and (94048) clevis pin to remove (94445) adapter.

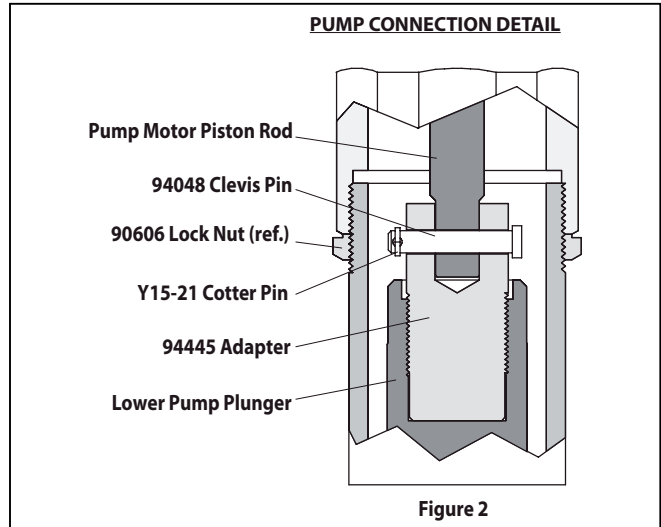


Figure 2

## REASSEMBLY

1. Assemble (94445) adapter to the air motor rod, aligning the through holes.
2. Assemble (94048) clevis pin through hole, securing adapter.
3. Assemble (Y15-21) cotter pin through the hole in the clevis pin.
4. Apply Loctite® 242 to threads of (94445) adapter and screw (94445) adapter into (90615-X) plunger.
5. Screw the lower pump assembly to the air motor.
6. Screw (90606) lock nut against the air motor base and tighten to 50 - 60 ft. lbs (67.8 - 81.3 Nm).

## OPERATION - SENSOR

Maximum Operating Voltage - 200VDC.

Switching Current -0.5 Amps.

Once the kit is installed in the pump, it may be interfaced with a control device in the following ways:

As a SOURCING switch (see figure 3) for use with PLC's.

As a SINKING switch (see figure 4) for use with PLC's.

As a closed contact switch (see figure 5) for use with meters.

